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|-------------------------------|------------------------|------------------------------|
| <b>Notice of Allowability</b> | <b>Application No.</b> | <b>Applicant(s)</b>          |
|                               | 09/929,894             | BUTTERWORTH, HENRY<br>ESMOND |
|                               | <b>Examiner</b>        | <b>Art Unit</b>              |
|                               | Miranda Le             | 2167                         |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to Amendment filed 03/29/2005.
2.  The allowed claim(s) is/are 1,2,7-15 and 18-27.
3.  The drawings filed on 11 January 2002 are accepted by the Examiner.
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6.  CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_.
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

Miranda Le  
April 25, 2005

***Response to Amendment***

1. Receipt of Applicant's Amendment filed March 29, 2005 is acknowledged.

Claims 1-27 are pending. Claims 1, 14, 27 are independent claims. In the Amendment, claims 1, 14, 27 have been amended, claims 3-6, 16-17 have been canceled, no claims have been added.

***Reasons for Allowance***

2. Claims 1-2, 7-15, 18-27 are allowed, now renumbered as 1-21.

3. The following is a statement of reasons for the indication of allowable subject matter:

The present invention is directed to a method for performing free space collection in an information storage system and an information storage system, wherein determining a fitness value for at least some of the segments by determining the product of the amount of free space in the segment and the expected time the free space will last.

Claims 1, 14, 27 identify the uniquely distinct feature of "the fitness value determined by the equation:

$$\text{Fitness} = \text{Segment age} \times \frac{\text{Free space}^2}{\text{Used space}}$$

wherein segment age is the interval between a current time and a time at which the data in the segment was last written, the segment age measured in one of real time, number of write transactions, number of segments written or destage sequence number, the segment age comprising one of a write interval for the segment, an average, maximum or minimum of the

ages of the data in the segment".

The closest prior art, Burkes et al. (U.S. Patent No. 5,604,902), shows a substantially similar data storage management system performing garbage collection to reduce fragmentation in storage by moving data from source fragmented areas to holes (unused storage space) in target fragmented areas. However, Burkes et al. fail to anticipate or render the above-cited limitations obvious.

4. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

### *Conclusion*

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Miranda Le whose telephone number is (703) 305-3203. The examiner can normally be reached on Monday through Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene, can be reached on (703) 305-9790. The fax number to this Art Unit is (703) 872-9306. The TC 2100's Customer Service number is (703) 306-5631.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

*Miranda Le*

Miranda Le  
April 25, 2005

